

-23-

## CLAIMS

1. A substrate processing method that  
exposes to an atmosphere including hydrogen radicals  
5 and hydrogen ions a substrate for an electronic  
device on which substrate a semiconductor device is  
formed,

wherein the hydrogen radicals and the  
hydrogen ions are formed by exciting a processing  
10 gas including a noble gas and hydrogen by a plasma.

2. The substrate processing method as  
claimed in claim 1, wherein the atmosphere including  
the hydrogen radicals and the hydrogen ions includes  
15 heavy hydrogen radicals and heavy hydrogen ions.

3. The substrate processing method as  
claimed in claim 1, wherein the plasma is formed by  
microwaves.

20

4. The substrate processing method as  
claimed in claim 1, wherein the plasma is formed by  
emitting microwaves from a planar antenna.

25 5. The substrate processing method as  
claimed in claim 1, wherein the semiconductor device  
includes a MOSFET.

6. The substrate processing method as  
30 claimed in claim 1, wherein the substrate for the  
electronic device is one of a Si substrate, a SiGe  
substrate, and a glass substrate.

BEST AVAILABLE COPY

-24-

7. The substrate processing method as claimed in claim 5, wherein the MOSFET includes one of a thermal oxide film and a thermal nitride film as a gate insulation film.

5

8. The substrate processing method as claimed in claim 5, wherein the MOSFET includes a gate insulation film formed by one of plasma oxidation, plasma nitriding, catalytic oxidation, catalytic nitriding, CVD, and PVD.

10

9. The substrate processing method as claimed in claim 1, wherein the semiconductor device includes a storage element using a high dielectric insulation film as an interelectrode insulation film.

15

BEST AVAILABLE COPY

-25-

## ABSTRACT

In a substrate processing method that  
exposes to hydrogen radicals (including heavy  
5 hydrogen radicals) a substrate for an electronic  
device on which substrate a semiconductor element is  
formed, the hydrogen radicals are excited by plasma  
formed by emitting microwaves to a planar antenna.

BEST AVAILABLE COPY